

# SCHAUER MANUFACTURING CORPORATION

*Speed Lathes · Grinders · Rectifiers · Battery Chargers · Auto Test Equipment*

4500 ALPINE AVENUE, CINCINNATI, OHIO 45242  
TELEPHONE AREA CODE 513 791-3030

Mr. T. Nelson, Systems Consultant  
Box 1546  
Poughkeepsie, New York 12603

RE: Schauer Zener Lab

Gentlemen:

In acknowledgment of your recent request, we are pleased to send literature describing the Schauer Zener Lab.

The Schauer Zener Lab, consisting of eighty diodes in increments of  $0.1 \pm .05$  volts, from 2.0 to 10.0 volts provide a low cost source of voltage reference to determine optimum voltage and tolerance parameters for circuitry, and may be connected in series to achieve higher voltages, tailored temperature coefficients and special circuit effects. Each diode has a conservative rating of 1/2 watt, and the voltage value is stamped on the body.

Just like the precision decade resistor and capacitance boxes, the Zener Lab at \$49.50 for 80 precision diodes offers the designer a third accurate parameter for his circuitry. We encourage you to consider purchasing the Lab while our stock is in good supply.

Yours very truly,

SCHAUER MANUFACTURING CORP.

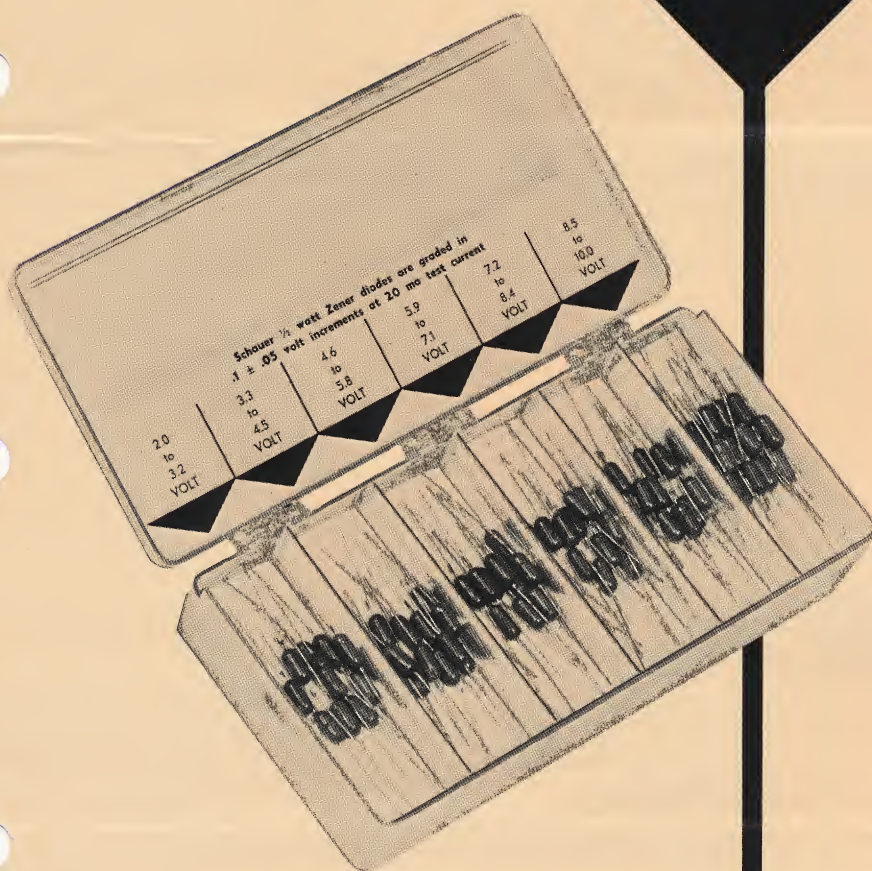
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R.C. Parsons,  
Manager Semiconductor Products

# SCHAUER

## SEMICONDUCTORS

CATALOG  
NO. 65-10



The "Zener Lab" consists of a kit of 80, 0.5 W zener diodes, supplied in increments of 2.0 — 10.0 V. Each zener is graded to  $\pm 0.05$  V tolerance at each voltage which is stamped on the zener body.

*The lab is a must for design engineers to determine the optimum voltage and tolerance of prototype circuitry.*

**PRICE: \$49.50**

**SV1 SILICON VARISTORS  
SZ ZENER DIODES  
COPPER OXIDE VARISTORS  
COPPER OXIDE RECTIFIERS**

Rectifier Manufacturers Since 1929

Semiconductor Division

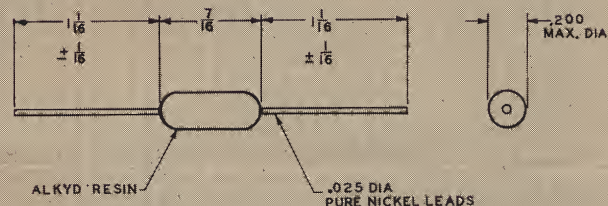
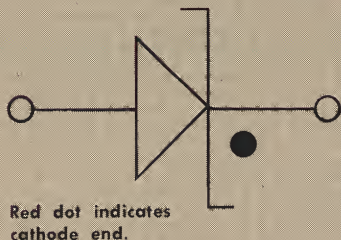
**SCHAUER MANUFACTURING CORP.**

4500 Alpine Avenue, Cincinnati, Ohio 45242



# SCHAUER

## Heavy Duty Type SZ ZENER DIODES



- Conservative 1/2 WATT RATING
- Large 10 watt junction in a small package.
- Cool operation. Insulated case.
- Mass-produced for LOW COST.

A mass-produced, large alloyed silicon junction has been placed into a small, rugged package to produce a zener diode with maximum surge capacity and stability. The low dynamic impedance assures superior performance in voltage regulators, clippers, surge protectors, and numerous other applications. An inner epoxy seal, long leakage paths, and high pressure molding permits reliable operation in all environments.

### Characteristics and Maximum Ratings:

Storage temperature: — 65° to 150°C.

Operating temperature: — 65° to 150°C.

Maximum junction temperature: 175°C.

Thermal resistance from junction to ambient: .15°C/mw (still air).

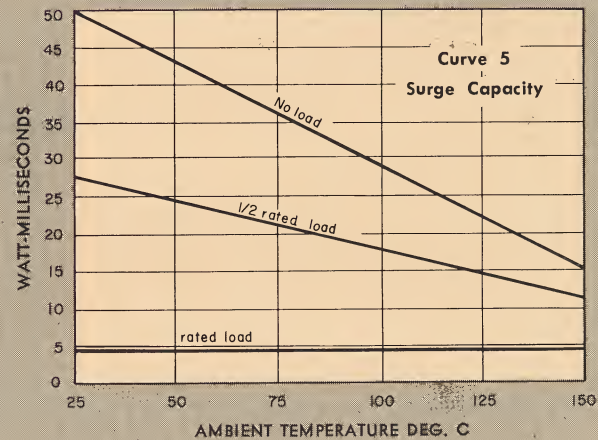
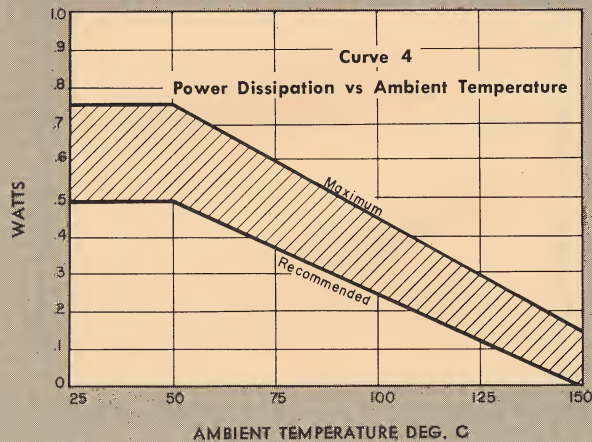
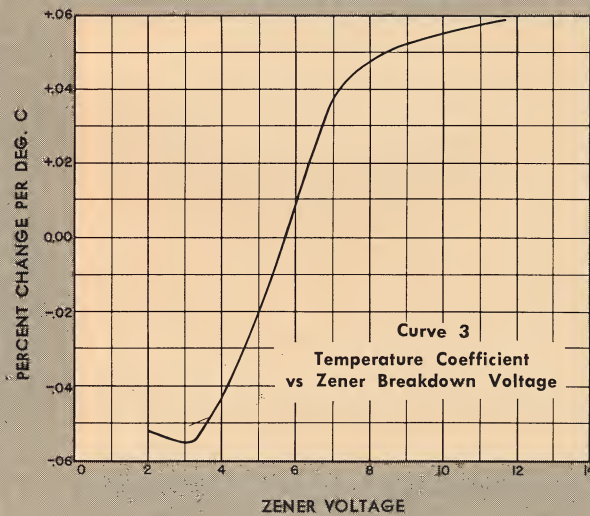
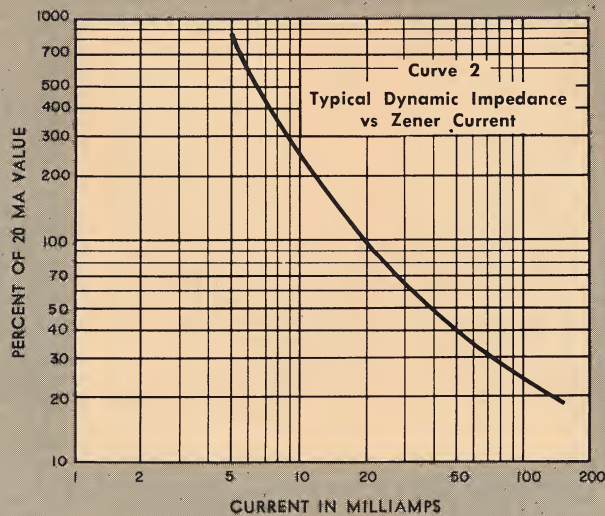
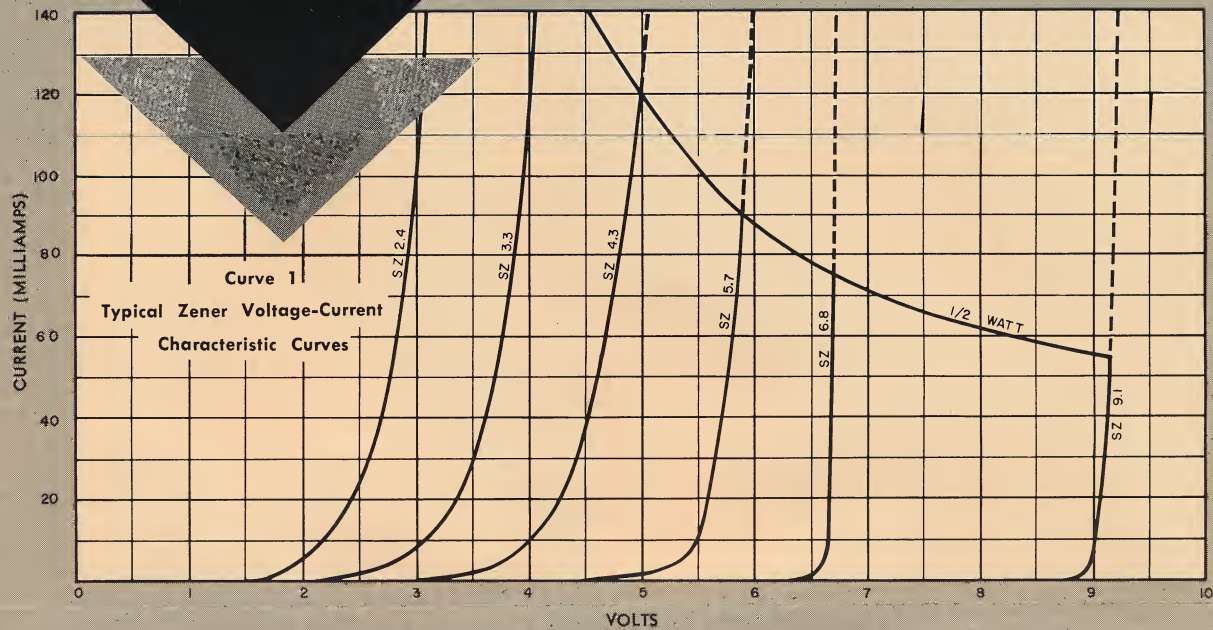
Forward drop at .5 amp.: 1.0V max.

## RATING TABLE

| Schauer<br>Type No.<br>10% Tolerance<br>(Note 1) | Nominal<br>Zener Voltage<br>$I_{ZT} = 20 \text{ ma}$<br>$T_A = 25^\circ\text{C}$ | Dynamic Impedance                   |                                     |                                     |                                      | Maximum<br>Recommended<br>Zener<br>Current | Typical<br>Temperature<br>Coefficient of<br>Voltage (%/°C) |
|--------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------------|------------------------------------------------------------|
|                                                  |                                                                                  | Maximum<br>$I_{ZT} = 20 \text{ ma}$ | Typical<br>$I_{ZT} = 20 \text{ ma}$ | Typical<br>$I_{ZT} = 50 \text{ ma}$ | Typical<br>$I_{ZT} = 100 \text{ ma}$ |                                            |                                                            |
| SZ 2.4                                           | 2.4 volts                                                                        | 32 ohms                             | 14 ohms                             | 6.2 ohms                            | 3.2 ohms                             | 210 ma                                     | — .054                                                     |
| SZ 2.7                                           | 2.7                                                                              | 32                                  | 16                                  | 7.0                                 | 3.7                                  | 185                                        | — .055                                                     |
| SZ 3.0                                           | 3.0                                                                              | 32                                  | 17                                  | 7.5                                 | 3.9                                  | 170                                        | — .055                                                     |
| SZ 3.3                                           | 3.3                                                                              | 30                                  | 17                                  | 7.5                                 | 3.9                                  | 150                                        | — .054                                                     |
| SZ 3.6                                           | 3.6                                                                              | 27                                  | 18                                  | 8.0                                 | 4.1                                  | 140                                        | — .050                                                     |
| SZ 3.9                                           | 3.9                                                                              | 25                                  | 17                                  | 7.5                                 | 3.9                                  | 130                                        | — .045                                                     |
| SZ 4.3                                           | 4.3                                                                              | 23                                  | 17                                  | 7.5                                 | 3.9                                  | 120                                        | — .037                                                     |
| SZ 4.7                                           | 4.7                                                                              | 20                                  | 12                                  | 5.3                                 | 2.8                                  | 110                                        | — .029                                                     |
| SZ 5.1                                           | 5.1                                                                              | 16                                  | 10                                  | 4.3                                 | 2.3                                  | 100                                        | — .019                                                     |
| SZ 5.6                                           | 5.6                                                                              | 12                                  | 6.0                                 | 2.6                                 | 1.4                                  | 90                                         | — .009                                                     |
| SZ 6.2                                           | 6.2                                                                              | 6                                   | 2.0                                 | 0.86                                | 0.5                                  | 80                                         | + .018                                                     |
| SZ 6.8                                           | 6.8                                                                              | 4                                   | 1.5                                 | 0.66                                | 0.4                                  | 75                                         | + .035                                                     |
| SZ 7.5                                           | 7.5                                                                              | 4                                   | 1.5                                 | 0.66                                | 0.4                                  | 70                                         | + .044                                                     |
| SZ 8.2                                           | 8.2                                                                              | 5                                   | 2.0                                 | 0.86                                | 0.5                                  | 60                                         | + .049                                                     |
| SZ 9.1                                           | 9.1                                                                              | 6                                   | 4.0                                 | 1.8                                 | 0.9                                  | 55                                         | + .053                                                     |
| SZ 10.0                                          | 10.0                                                                             | 8                                   | 6.0                                 | 2.6                                 | 1.4                                  | 50                                         | + .055                                                     |

Note 1: Add suffix "A" for 5% tolerance (i.e., SZ 4.7A for 4.7 ± 5% volts). 1.0% and 2.0% units available from factory.





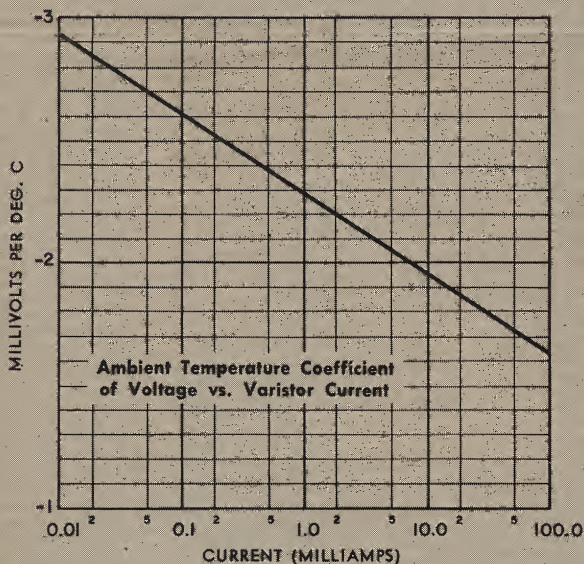
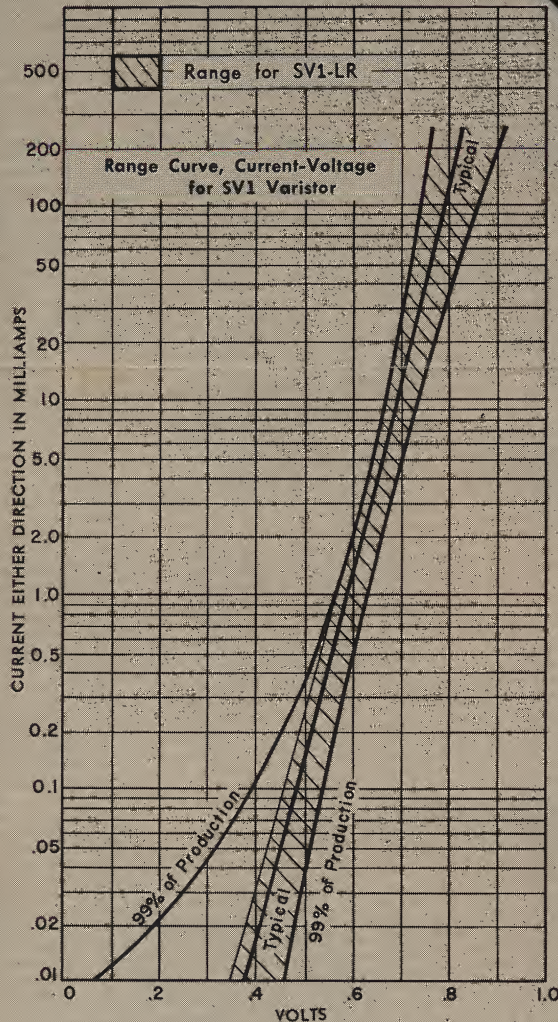
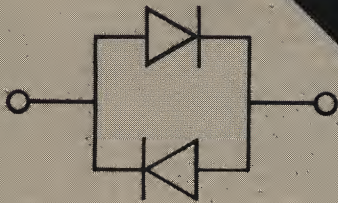
The shaded area may be used without benefit of surge ratings shown in Curve 5.

Maximum pulse or surge power in either direction for times between 1.0 and 10.0 ms. Refer to Curve #4 for rated load at specific ambients. For recurrent surges at maximum ratings, the diode must be allowed to reach equilibrium (approx. 2 secs.).



# SCHAUER

## SILICON VARISTORS



### SV1 VARISTOR

The Schauer **SV1** Varistor consists of two matched silicon junctions connected in parallel and oppositely poled. The unit is encapsulated with an alkyd molding compound and has 0.025" dia., welded, axial nickel leads.

It is designed to replace the Schauer Model A5134 copper oxide varistor in telephone service and for numerous other applications such as fractional voltage regulators, negative temperature coefficient resistors, and meter protectors. They may be placed in series or parallel to yield higher voltages or currents.

The **SV1** Varistor directly converts linear AC and DC information into logarithmic information over four decades following the curve  $I_{ma} = e^{26(E-.59)}$  between the ranges  $I = .02\text{ma}$  to 200 ma. The dynamic impedance at any current may be calculated by  $Z_d(\text{ohms}) = 1/26I$  (amps).

### SV1-LR VARISTOR

The Schauer **SV1-LR** Varistor is identical to the **SV1** except that the log characteristics have been extended to five decades. This premium unit is designed for critical applications in the microamp range. Varistors with special characteristics and tolerances within the boundaries of the range curves are available from the factory at nominal charge.

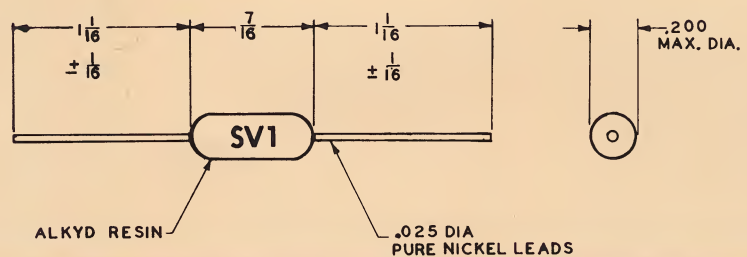
### Electrical Characteristics

Test limits: 10 microamperes max. at .2V DC  
100 milliamperes min. at .9V DC  
10 microamperes max. at .35V DC (SV1-LR only)

Dissipation.  $\frac{3}{4}$  watt at 25°C,  $\frac{1}{4}$  watt at 100°C. Maximum  $\frac{1}{2}$  cycle surge current: 25 amps peak.

### Physical Characteristics

An inner epoxy seal, long leakage paths, and high pressure molding assures reliable performance in all environments.



Semiconductor Division

**SCHAUER MANUFACTURING CORP.**

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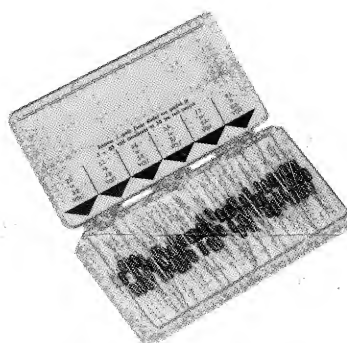


# S C H A U E R

## PRICE SHEET FOR ORIGINAL EQUIPMENT MANUFACTURERS

### SILICON VARISTOR AND 1/2 WATT ZENER DIODES

| SCHAUER<br>TYPE (Note 1)                                                                                                                                                                                                                                                                | Q U A N T I T Y |           |           |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------|-----------|-----|
|                                                                                                                                                                                                                                                                                         | 1 - 99          | 100 - 499 | 500 - 999 | 1M  |
| <b>SILICON VARISTORS</b>                                                                                                                                                                                                                                                                |                 |           |           |     |
| SV1                                                                                                                                                                                                                                                                                     | .41             | .35       | .29       | .24 |
| V67                                                                                                                                                                                                                                                                                     | .42             | .36       | .30       | .25 |
| SV1 - LR                                                                                                                                                                                                                                                                                | .43             | .37       | .31       | .26 |
| V64 and V49                                                                                                                                                                                                                                                                             | .45             | .39       | .33       | .28 |
| <b>ZENER DIODES</b>                                                                                                                                                                                                                                                                     |                 |           |           |     |
| SZ2.4 20%                                                                                                                                                                                                                                                                               | .43             | .34       | .30       | .27 |
| through 10%                                                                                                                                                                                                                                                                             | .50             | .39       | .35       | .32 |
| SZ10.0 5%                                                                                                                                                                                                                                                                               | .67             | .54       | .48       | .43 |
| <p>Note 1 — Add suffix "A" for 5% tolerance (i.e.: SZ4.7A for <math>4.7 \pm 5\%</math> volts)<br/>Add suffix 15% or 20% for broad tolerance units.</p> <p>Note 2 — Mixed Types will receive total quantity price.</p> <p style="text-align: center;"><b>Minimum Billing \$10.00</b></p> |                 |           |           |     |



Zener Lab consisting of 80 closely graded diodes in .1 volt steps from 2.0 to 10.0 volts. Each diode is stamped with its voltage and the lot is packaged into a sturdy compartmented plastic box.

**\$49.50 lots of 1-9**

**TERMS:** 1st to 15th, 1% — 25th inst.  
16th to 31st 1% — 10th prox.  
Net 30 days.

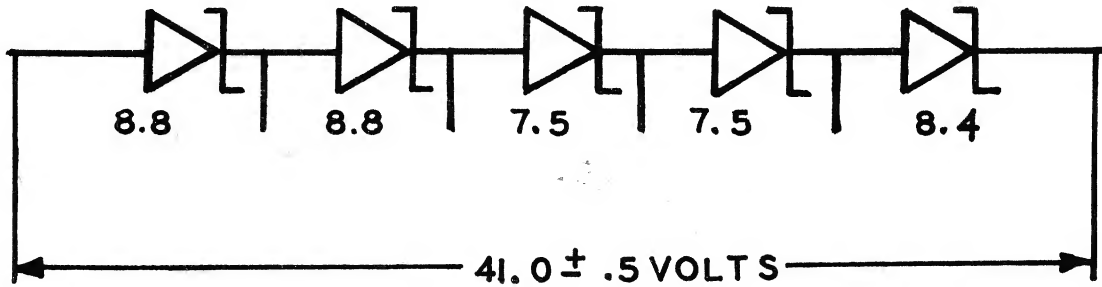
**DELIVERY:** F.O.B., Cincinnati, Ohio

Prices subject to change without notice

SEMICONDUCTOR DIVISION  
**SCHAUER MANUFACTURING CORPORATION**  
4500 ALPINE AVENUE  
CINCINNATI, OHIO 45242

# SCHAUER ZENER STRINGS

A unique system of stocking accurately graded zener diodes permits the user to purchase a series combination whose voltage sum equals some precise value at a cost equal to the number of 5% tolerance zeners used in the string. Series strings at 1% tolerance often cost less than the equivalent 5% single diode. The design engineer may choose the nominal voltage of each diode giving him control of the temperature coefficient and the zener impedance. The zener strings have characteristics approaching typical values by a factor equal to the number in the string because of the averaging effect.



**5 SZ 8.2**

User selects number  
of 5% diodes.

User selects nominal voltage  
rating of each diode.

- User cost — Total number of 5% diodes.
- Voltage tolerance —  $N \times 0.1$  volts.
- Power handling capacity —  $N \times 1/2$  watt.
- Dynamic Impedance —  $N \times$  Catalog listing.
- Temperature coefficient — Catalog listing.
- Diode voltages between Catalog values are available in 0.1 volt multiples at no extra charge.

## COMPARISON CHART FOR A 56 VOLT STRING

| TYPE                              | 1N3038B             | SCHAUER<br>6SZ9.3  | 1N2999              | SCHAUER<br>10SZ5.5         | 1N1742A                   |
|-----------------------------------|---------------------|--------------------|---------------------|----------------------------|---------------------------|
| Cost in 50 lots . . . . .         | \$6.00              | \$3.24             | \$8.75              | \$4.80                     | \$57.60                   |
| Voltage and Tolerance . . . . .   | 56.0 ± 2.8<br>volts | 55.8 ± .6<br>volts | 56.0 ± 5.6<br>volts | 55.0 ± 1.0<br>volts        | 49.6 ± 2.5<br>volts       |
| Dynamic Impedance . . . . .       | 110 ohms<br>max.    | 20 ohms<br>typical | 16 ohms<br>max.     | 45 ohms<br>typical         | 180 ohms<br>max.          |
| Power Dissipation . . . . .       | 1W                  | 3W                 | 10W                 | 5W                         | use at .35W               |
| Heat Sink Required . . . . .      | No                  | No                 | Yes                 | No                         | No                        |
| Temperature Coefficient . . . . . | 62mv/°c             | 56mv/°c            | 62mv/°c             | * ± 5mv/°c<br>typ. @ 20 ma | ± 1mv/°c<br>max. @ 7.0 ma |

\*Current adjustment should reduce to less than 1 mv/°c.